



10-9-2014

# Tougher than Rocket Science, or Just Messier? Using Research to Improve U.S. Public Health Delivery

Glen P. Mays

University of Kentucky, [glen.mays@cuanschutz.edu](mailto:glen.mays@cuanschutz.edu)

**Right click to open a feedback form in a new tab to let us know how this document benefits you.**

Follow this and additional works at: [https://uknowledge.uky.edu/hsm\\_present](https://uknowledge.uky.edu/hsm_present)

 Part of the [Health and Medical Administration Commons](#), [Health Economics Commons](#), [Health Policy Commons](#), and the [Health Services Research Commons](#)

---

## Repository Citation

Mays, Glen P., "Tougher than Rocket Science, or Just Messier? Using Research to Improve U.S. Public Health Delivery" (2014). *Health Management and Policy Presentations*. 76.  
[https://uknowledge.uky.edu/hsm\\_present/76](https://uknowledge.uky.edu/hsm_present/76)

This Presentation is brought to you for free and open access by the Health Management and Policy at UKnowledge. It has been accepted for inclusion in Health Management and Policy Presentations by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

# Tougher than Rocket Science, or Just Messier?

## Using Research to Improve U.S. Public Health Delivery

Glen Mays, PhD, MPH  
University of Kentucky

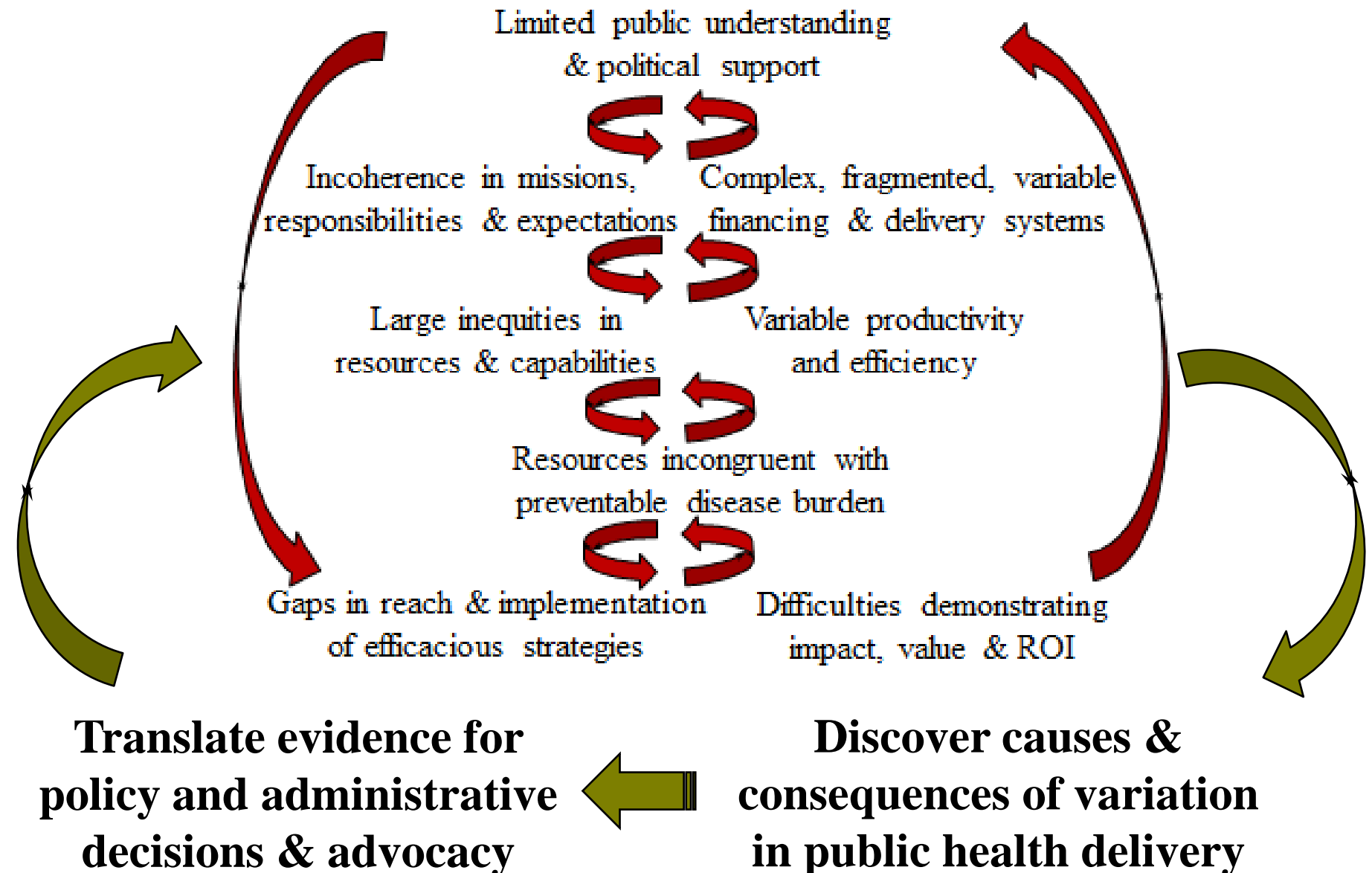
[glen.mays@uky.edu](mailto:glen.mays@uky.edu)

University of Victoria | Renewing Public Health Systems & Services | 9 October 2014

# Overview

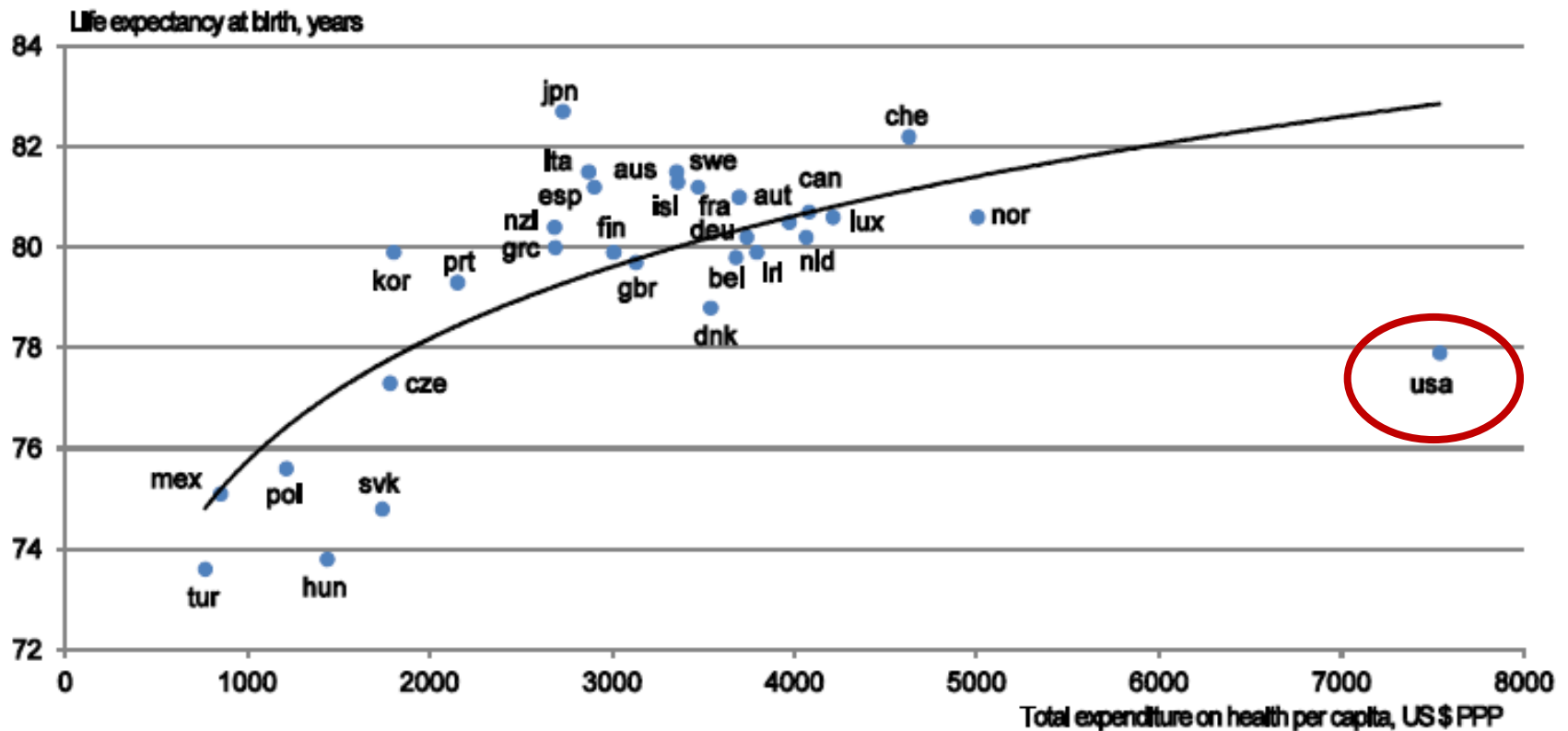
- Why study public health systems?
- Examples of systems research in public health
  - Delivery system organization & structure
  - Finance and economics
- Resources for advancing the field

# Vicious cycles to learning systems



# Failures in population health

Figure 1. There are large differences in life expectancy and health care spending across OECD countries 2008<sup>1</sup>



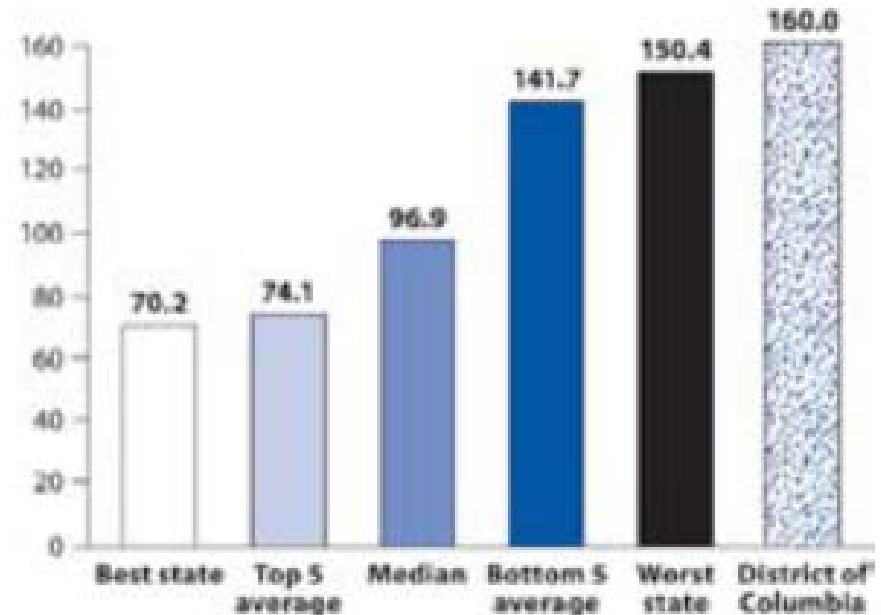
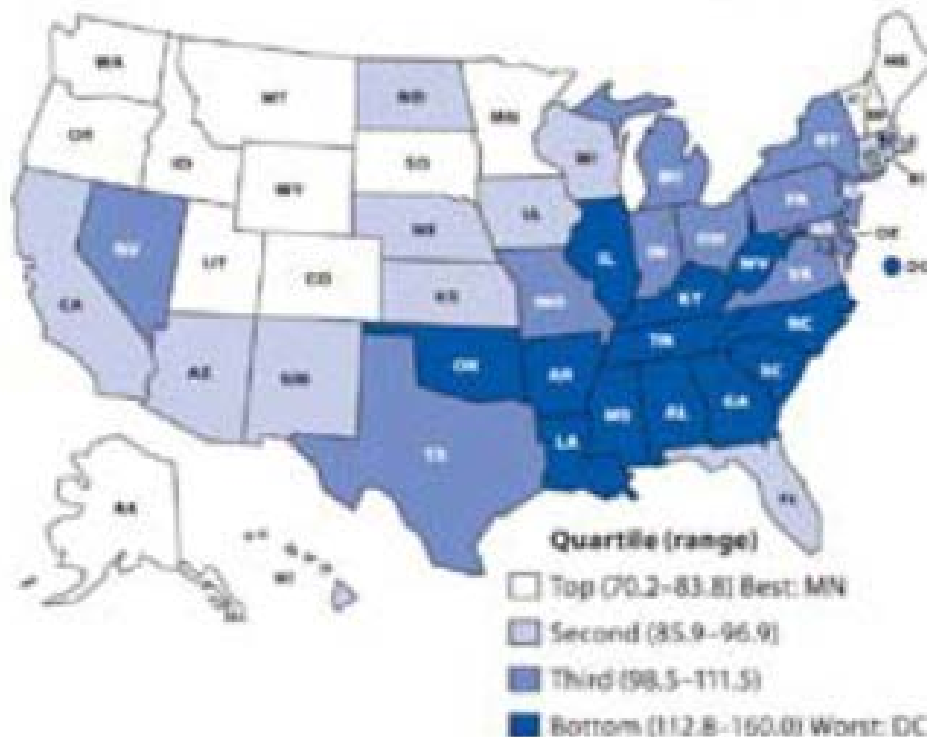
1. Or latest year available.

Source: OECD Health Data 2010.

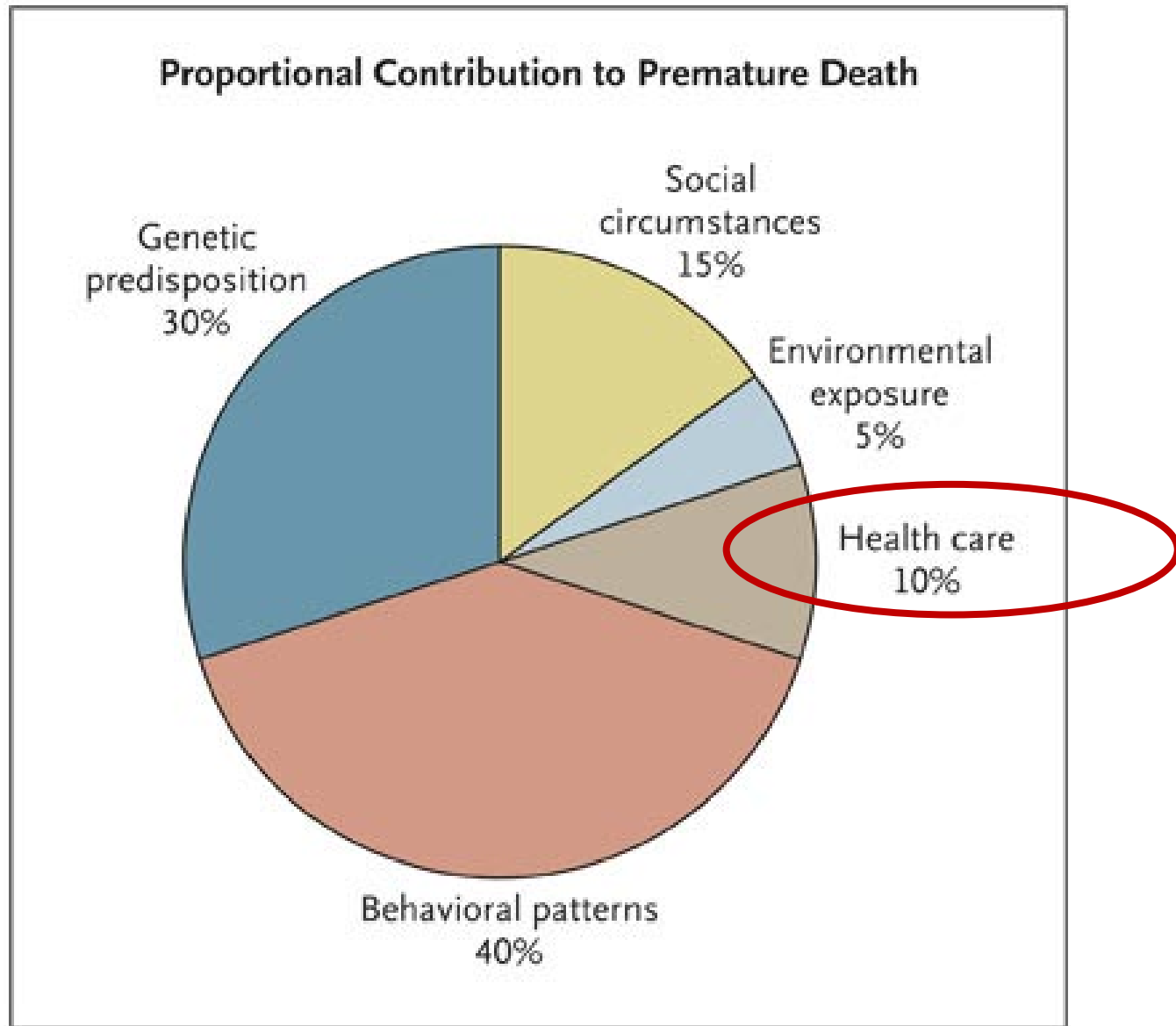
# Failures in population health

## Premature Deaths per 100,000 Residents

U. S. Average = 103 Deaths per 100,000



# Drivers of population health failures



# Drivers of population health failures

**>75%** of US health spending is attributable to conditions that are largely preventable

- Cardiovascular disease
- Diabetes
- Lung diseases
- Cancer
- Injuries
- Vaccine-preventable diseases and sexually transmitted infections

**<5%** of US health spending is allocated to prevention and public health



# Missed opportunities in public health delivery


Evidence-based public health strategies reach less than two-thirds of U.S. populations at risk:

- Smoking cessation
- Influenza vaccination
- Hypertension control
- Nutrition & physical activity programs
- HIV prevention
- Family planning
- Substance abuse prevention
- Interpersonal violence prevention
- Maternal and infant home visiting for high-risk populations



# Public health services & systems research

A field of inquiry examining the *organization*, *financing*, and *delivery* of public health services at local, state and national levels, and the *impact* of these activities on *population health*

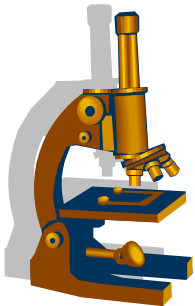


- Strategies to promote health and prevent disease & injury on a population-wide basis: programs, policies, administrative practices

# PHSSR's place in the continuum

## Intervention Research

- What works – proof of efficacy
- Controlled trials
- *Guide to Community Preventive Services*



## Services/Systems Research

- How to organize, implement and sustain in the real-world
  - Reach
  - Enforcement/Compliance
  - Quality/Effectiveness
  - Cost/Efficiency
  - Equity/Disparities
- Impact on population health
- Comparative effectiveness & efficiency

# Striving for authenticity in practice-based research

- Research that tests effectiveness & impact of public health practices in real-world ***public health settings***
- Research designed to address uncertainties and information needs of real-world public health ***decision-makers***
- Research that evaluates the implementation and impact of ***innovations in practice***
- Research that uses ***observations generated through public health practice*** to produce new knowledge

# Complexity in public health delivery systems



# A Key PHSSR Goal: Optimization

How to optimally deploy a diverse collection of responsibilities, resources, actors & expectations?

- Epidemiologic **surveillance & investigation**
  - Community health **assessment & planning**
  - Communicable disease control
  - Chronic disease and injury prevention
  - Health education and communication
  - Environmental health **monitoring and assessment**
  - Enforcement of health **laws and regulations**
  - Inspection and licensing
  - **Inform, advise, and assist** school-based, worksite-based, and community-based health programming
- ...and roles in **assuring access** to medical care



**Public Health**  
Prevent. Promote. Protect.

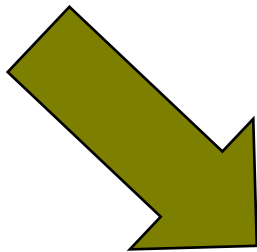
# Standardization vs. Customization in public health delivery

## Standardization

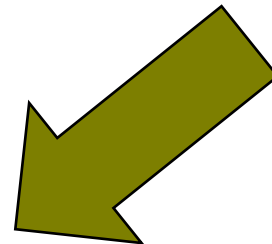
- ▼ Harmful variation
- ▼ Wasteful variation
- ▼ Inequitable variation
- ▼ Race to the bottom
- ▲ Network externalities:  
interoperability/coordination

## Customization

- ▲ Target resources to  
greatest needs/risks
- ▲ Tailor approaches to  
values & preferences of  
stakeholders
- ▲ Deploy unique resources  
& skills to their best  
purposes

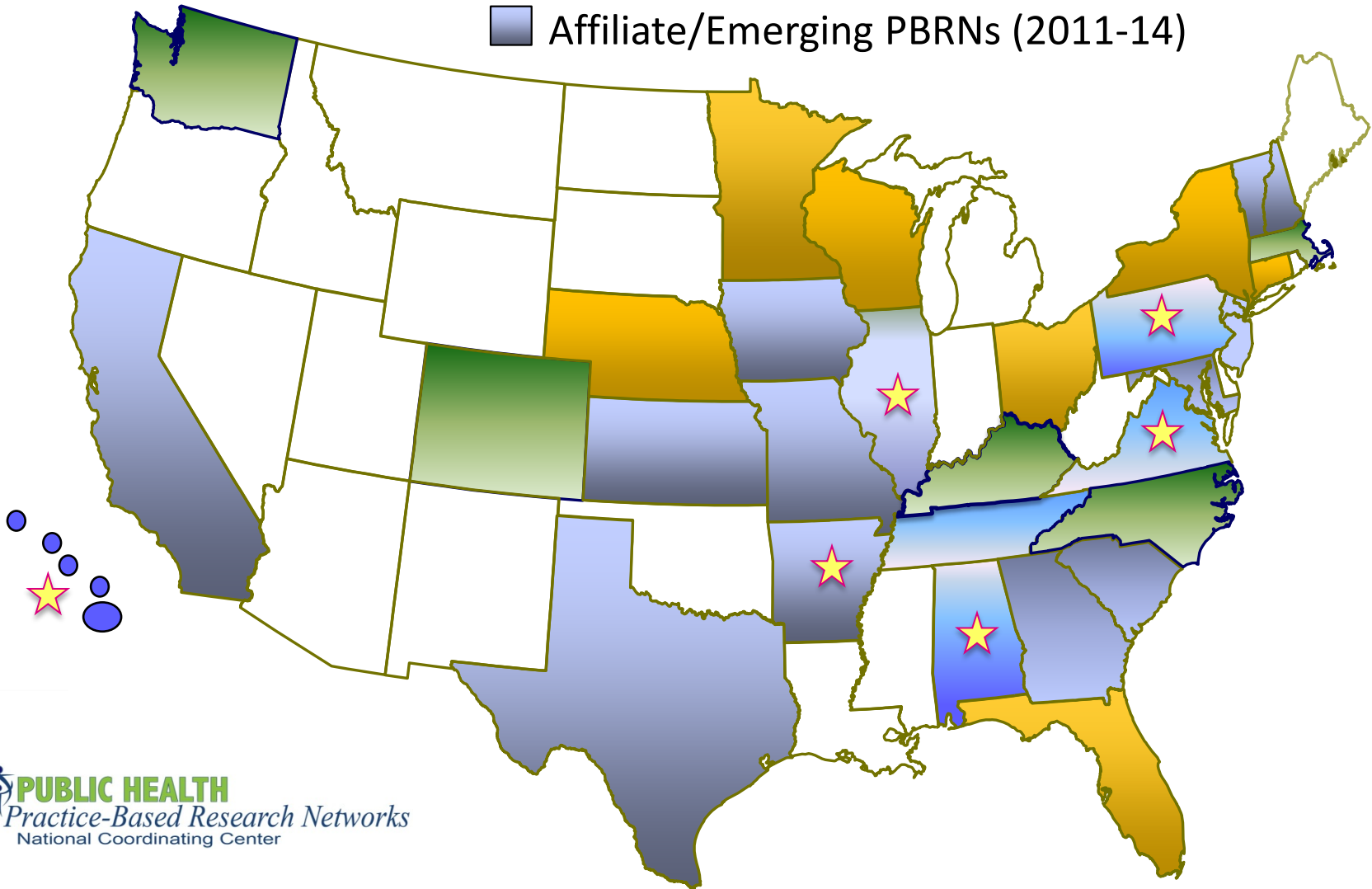


**Effectiveness**  
**Efficiency**  
**Equity**



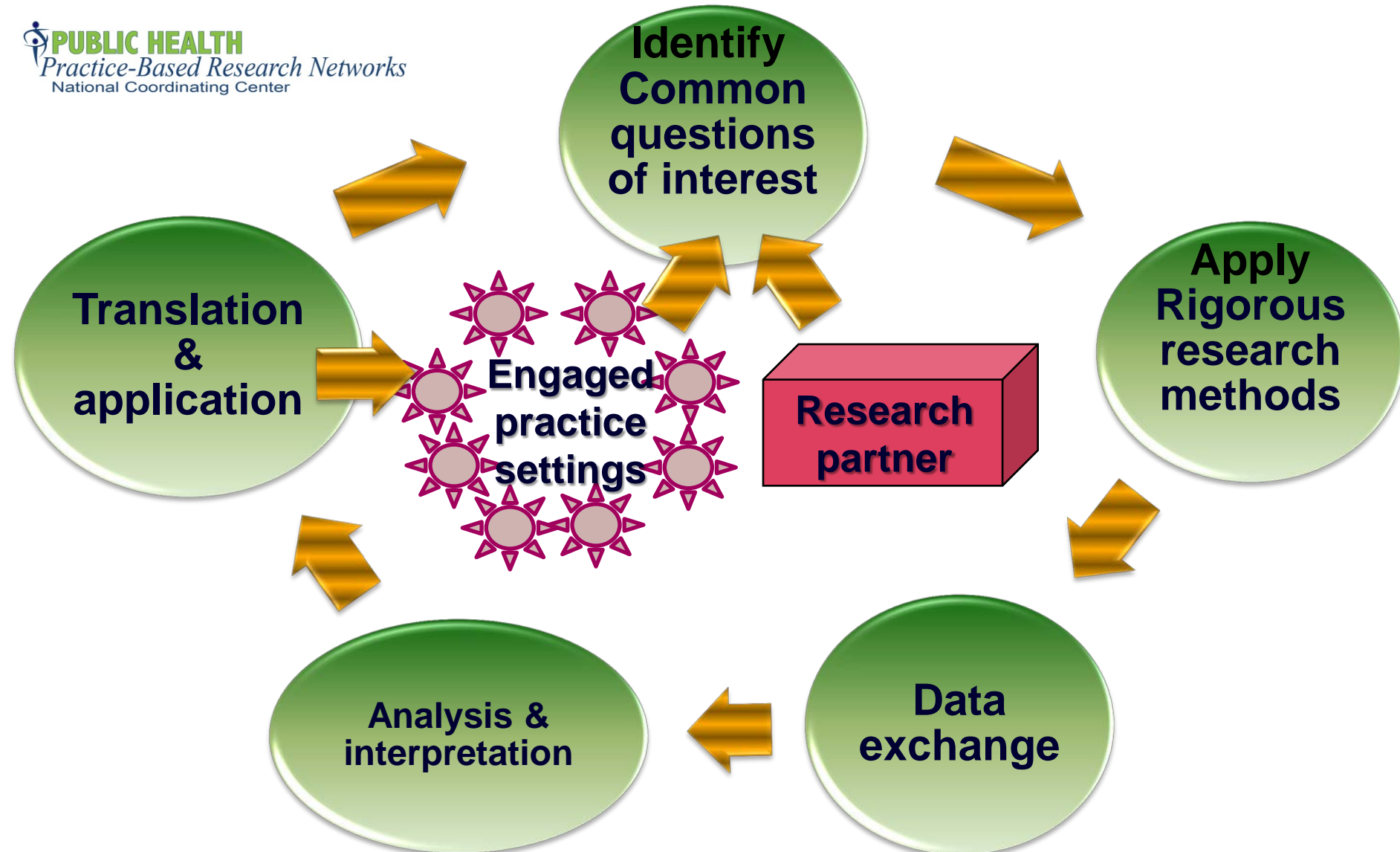
# Diffusion of Public Health PBRNs

- First cohort (December 2008 start-up)
- Second cohort (January 2010 start-up)
- Affiliate/Emerging PBRNs (2011-14)





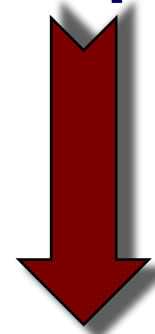
# PBRNs as Mechanisms for Learning



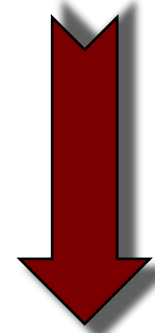
# Pathways for research and learning about public health value

- Measuring practice & performance
- Detecting variation in practice
- Examining determinants of variation
  - Organization
  - Financing
  - Workforce
  - Law & policy
  - **Information**
  - Preference
- Determining consequences of variation
  - Health outcomes
  - Economic outcomes
  - Medical care use
  - Disparities
- Testing strategies to reduce harmful, wasteful, & inequitable variation in practice and outcomes

**Descriptive**



**Inferential**



**Translational**

# PBRN Research Progression

Delivery System Organization and Structure



Practice Variation



Volume, Intensity, and Quality of Delivery

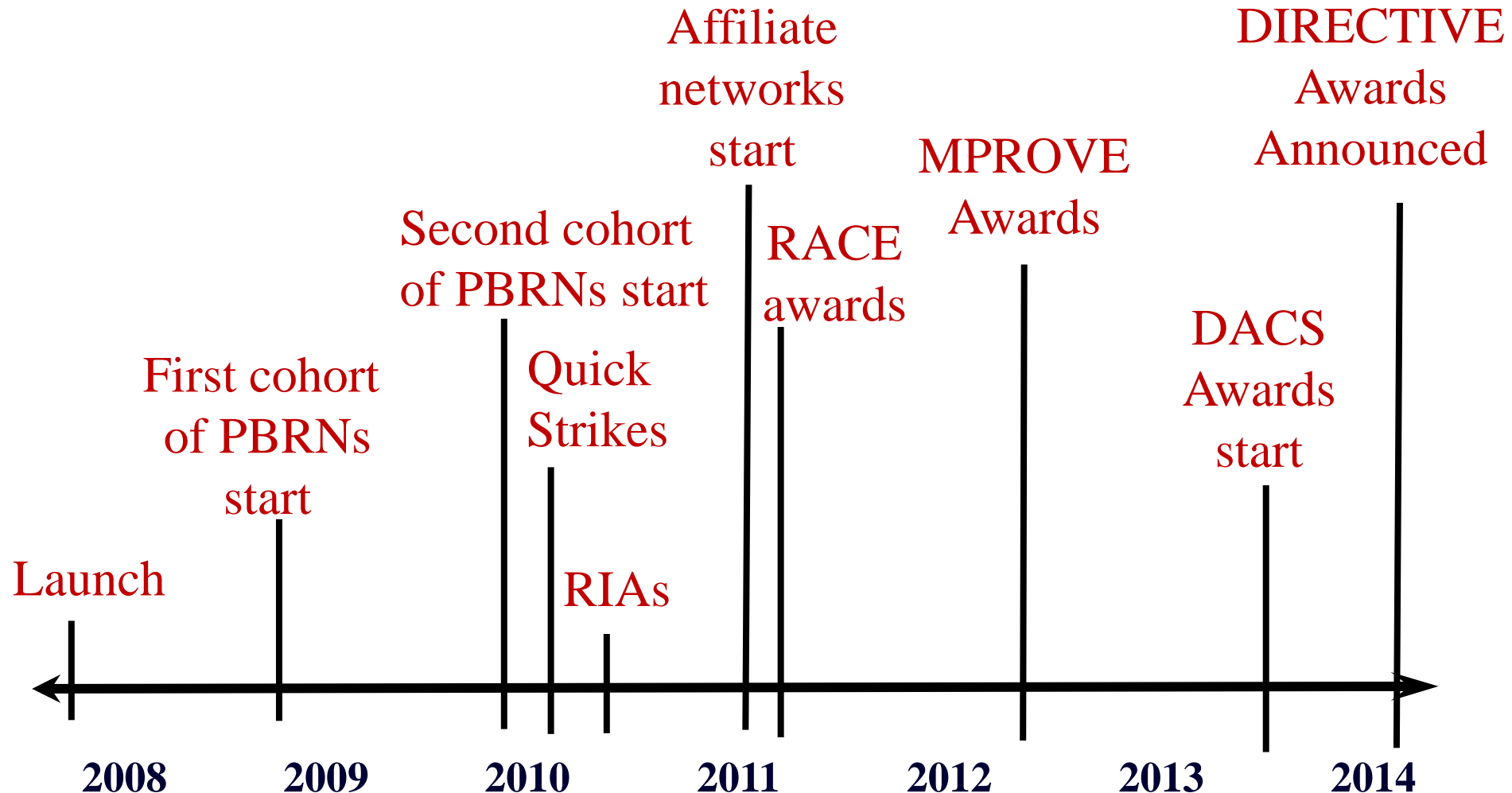


**Cost of Delivery**



**Value of Delivery**

# A PBRN Timeline



# PBRN Reach

- 1593 local public health agencies
- 35 state agencies
- 52 academic research units
- 58 professional & community organizations

# Productivity & Dissemination

- 60 competitively awarded research projects
- 68 articles in peer-reviewed journals
- 221 presentations and conferences & meetings
- 51 reports & tools in the grey literature
- Earned media in elite venues: *Modern Healthcare*, *Forbes*, *Kaiser Health News*, *Men's Health*
- >15,000 downloads of *Frontiers in PHSSR* articles
- >8,000 downloads from Research Archive
- >2,000 page views on PublicHealthEconomics blog

- Intramural research activities
  - **Public Health Value**: Cost estimation & economic evaluation
  - **Public Health Reform**: Effects of ACA on public health delivery
- Extramural research programs
  - Quick Strike studies
  - Natural Experiments in Public Health Delivery
  - Predoctoral and Postdoctoral Awards
  - Mentored Research Scientist Awards

## ■ Data Development

- Periodic census surveys of local and state agencies
- National Longitudinal Survey of Public Health Systems
- Tracking PH expenditures: US Census of Governments, Uniform Public Health Chart of Accounts
- Public Health Activities and Services Tracking (PHAST): compiling existing administrative data across states

## ■ Dissemination & Translation

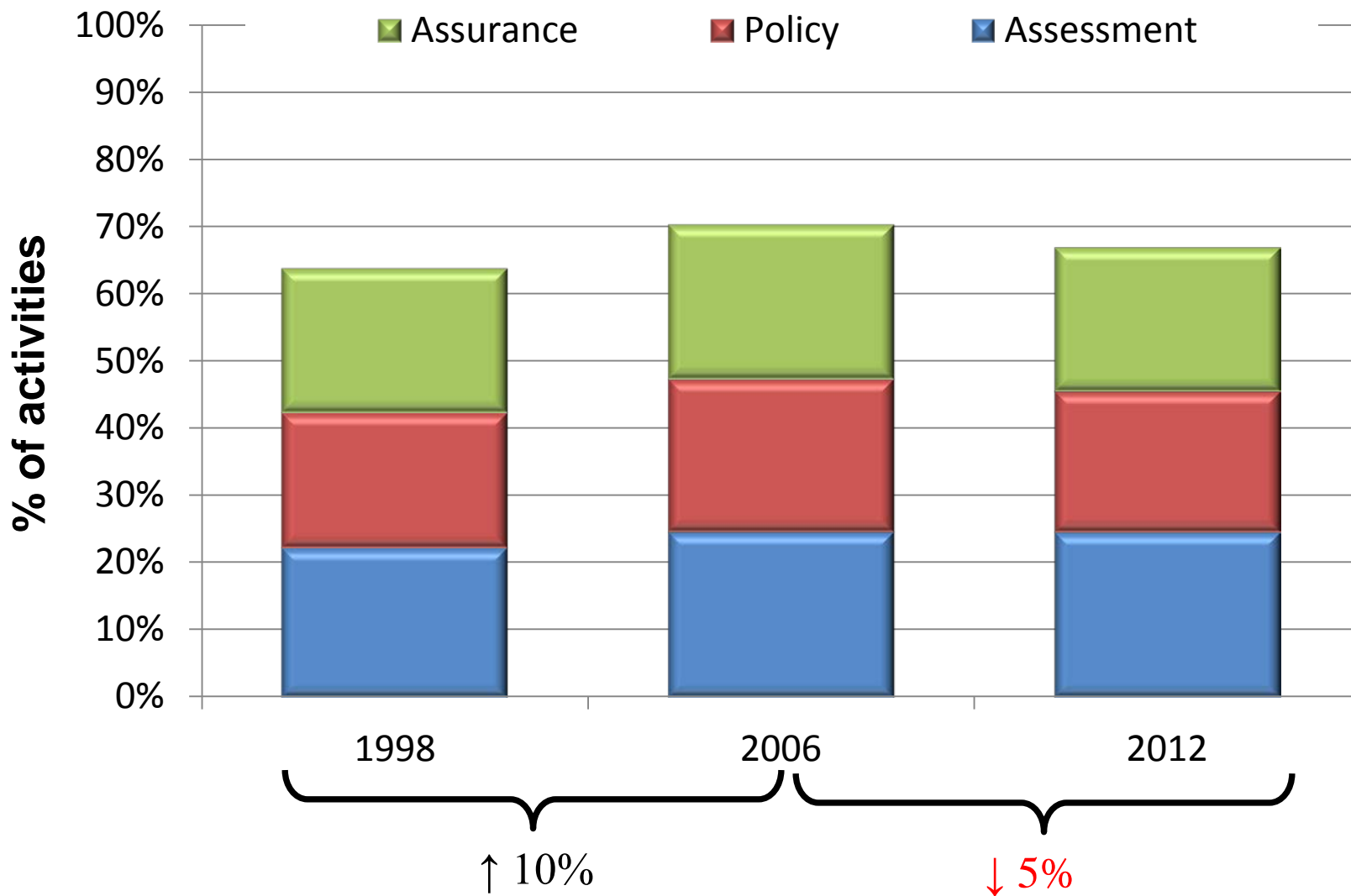
- Weekly Work in Progress Webinars
- Open-access journal: ***Frontiers in PHSSR***
- Newsletters, Podcasts, Blogs
- Briefings with policy stakeholders



# Ongoing research: organization and structure

- Who contributes to public health delivery?
- How are roles and responsibilities divided?
- How and why do delivery systems vary and change over time?
- How do system structures affect public health delivery and outcomes?

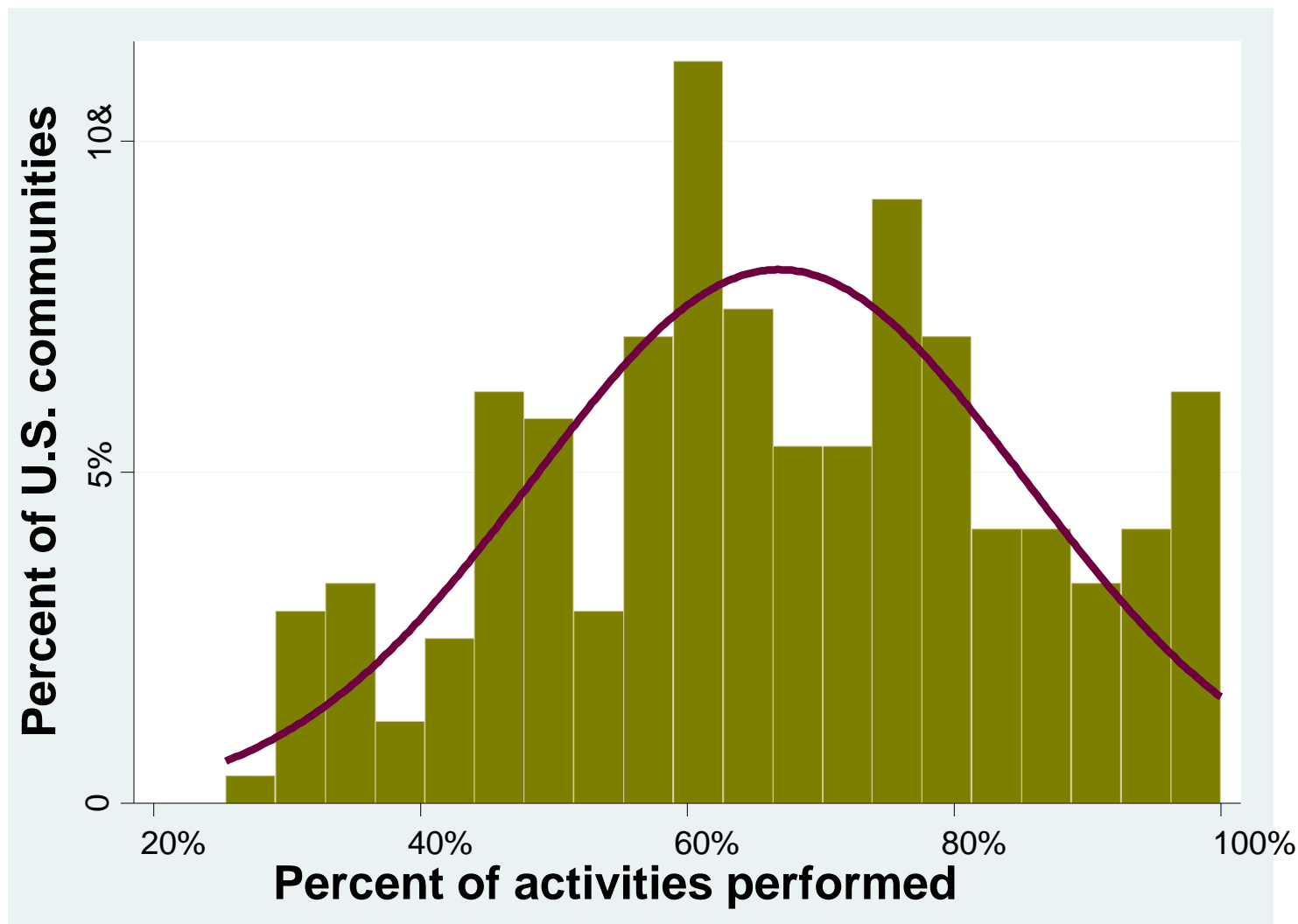
# Delivery of recommended public health activities



National Longitudinal Survey of Public Health Systems, 2012

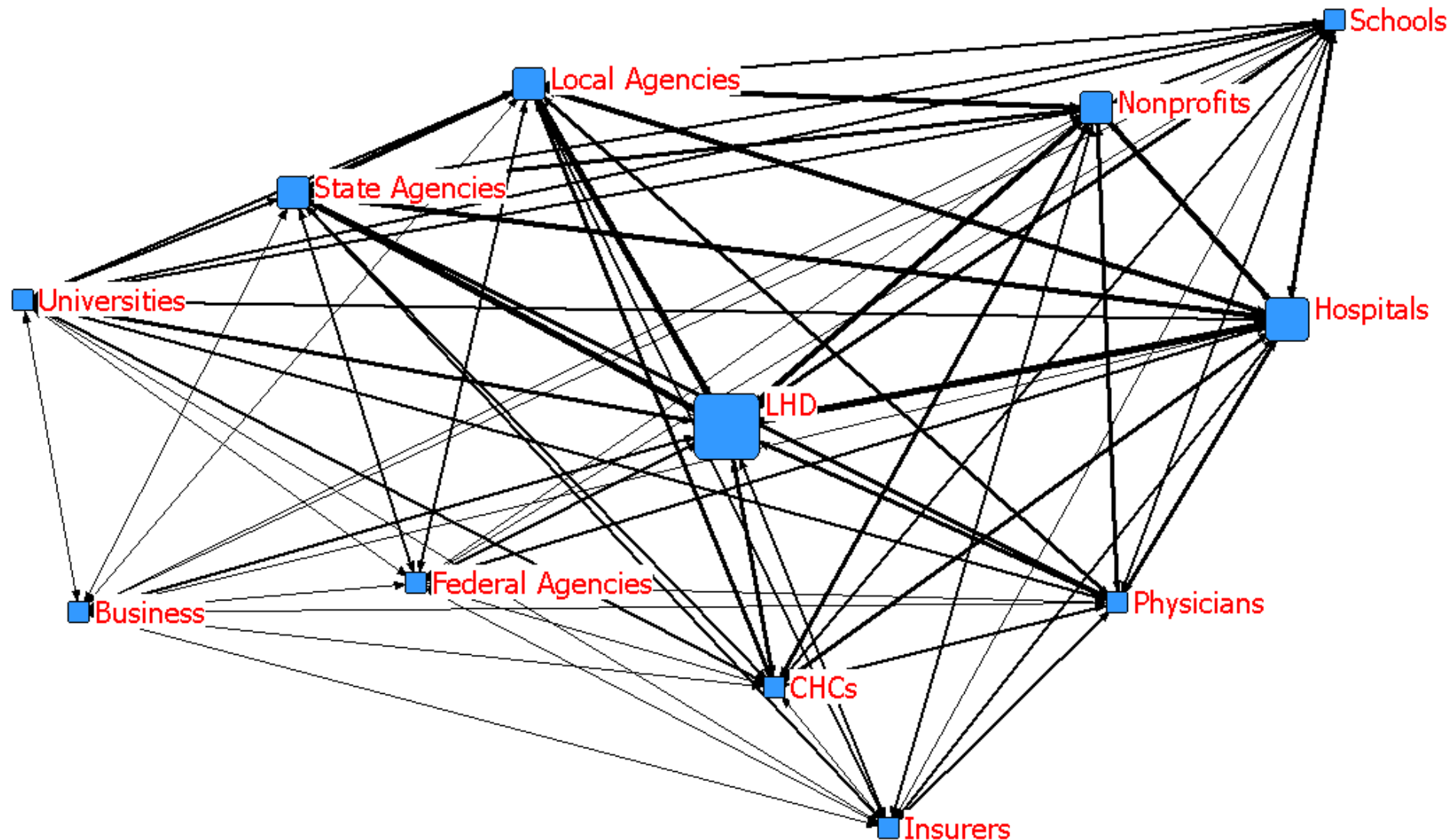
# Variation in Scope of Public Health Delivery

Delivery of recommended public health activities, 2012



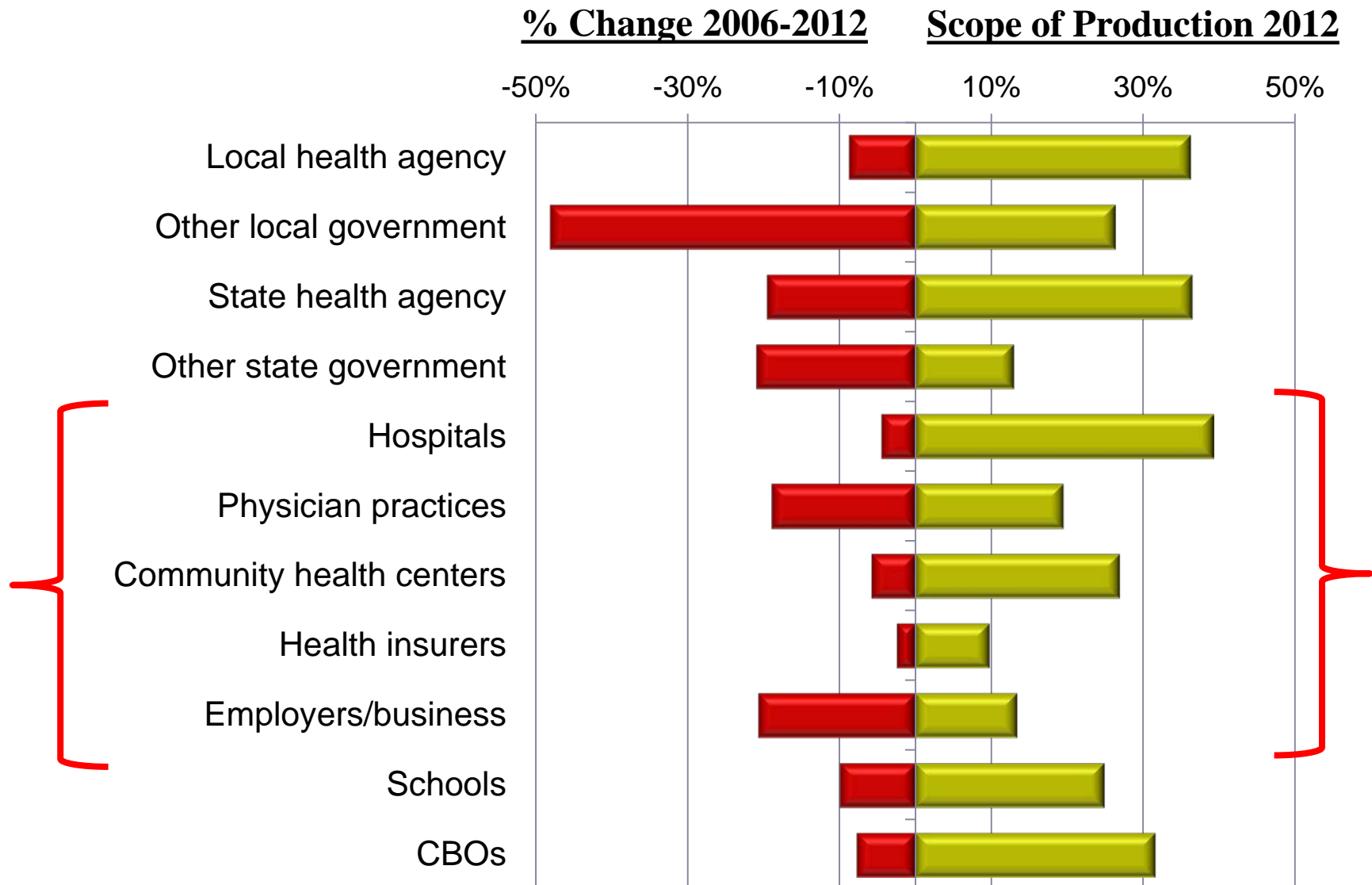
National Longitudinal Survey of Public Health Systems, 2012

# Inter-organizational relationships in public health delivery systems



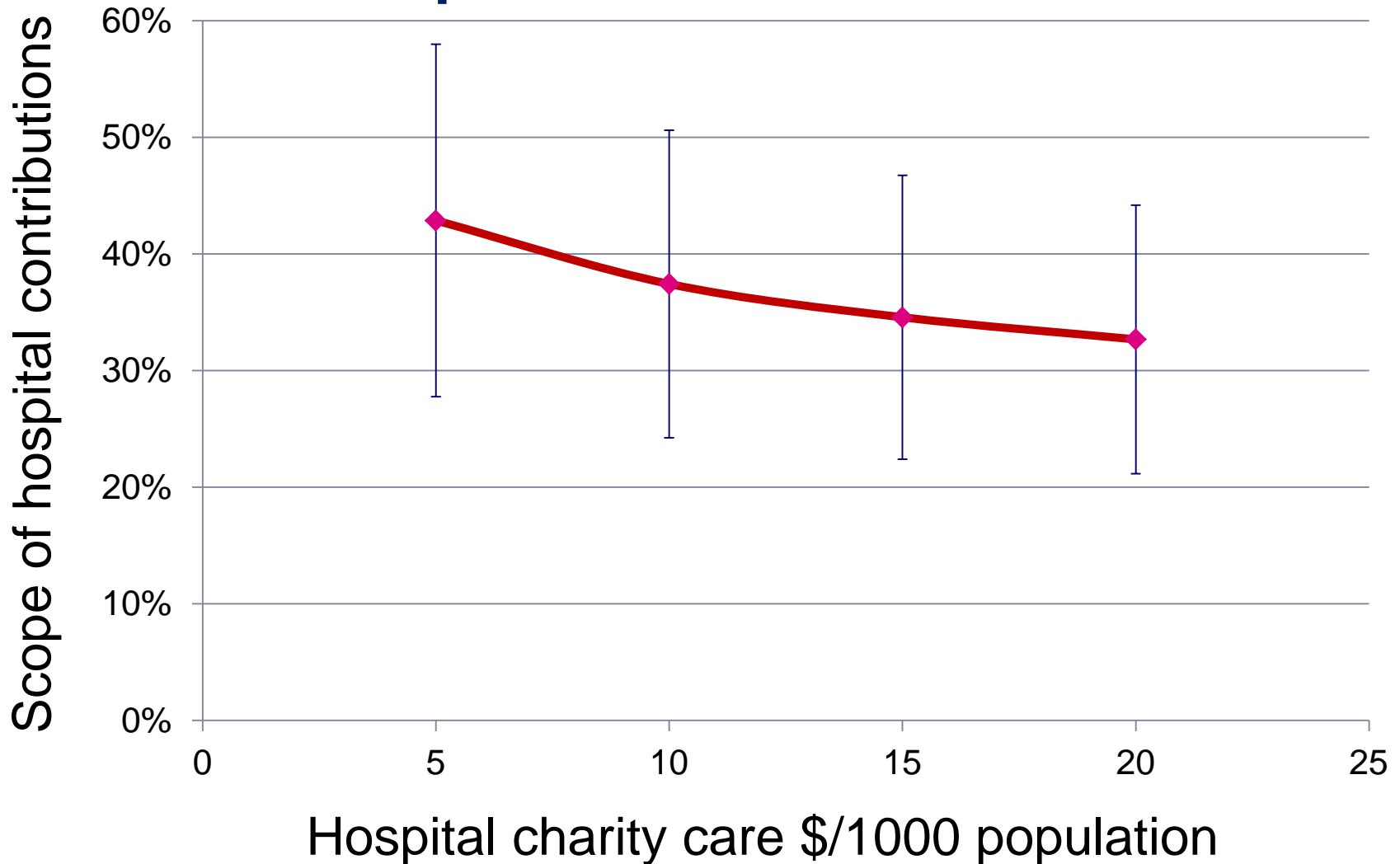
National Longitudinal Survey of Public Health Systems, 2012

# Organizations contributing to local public health production



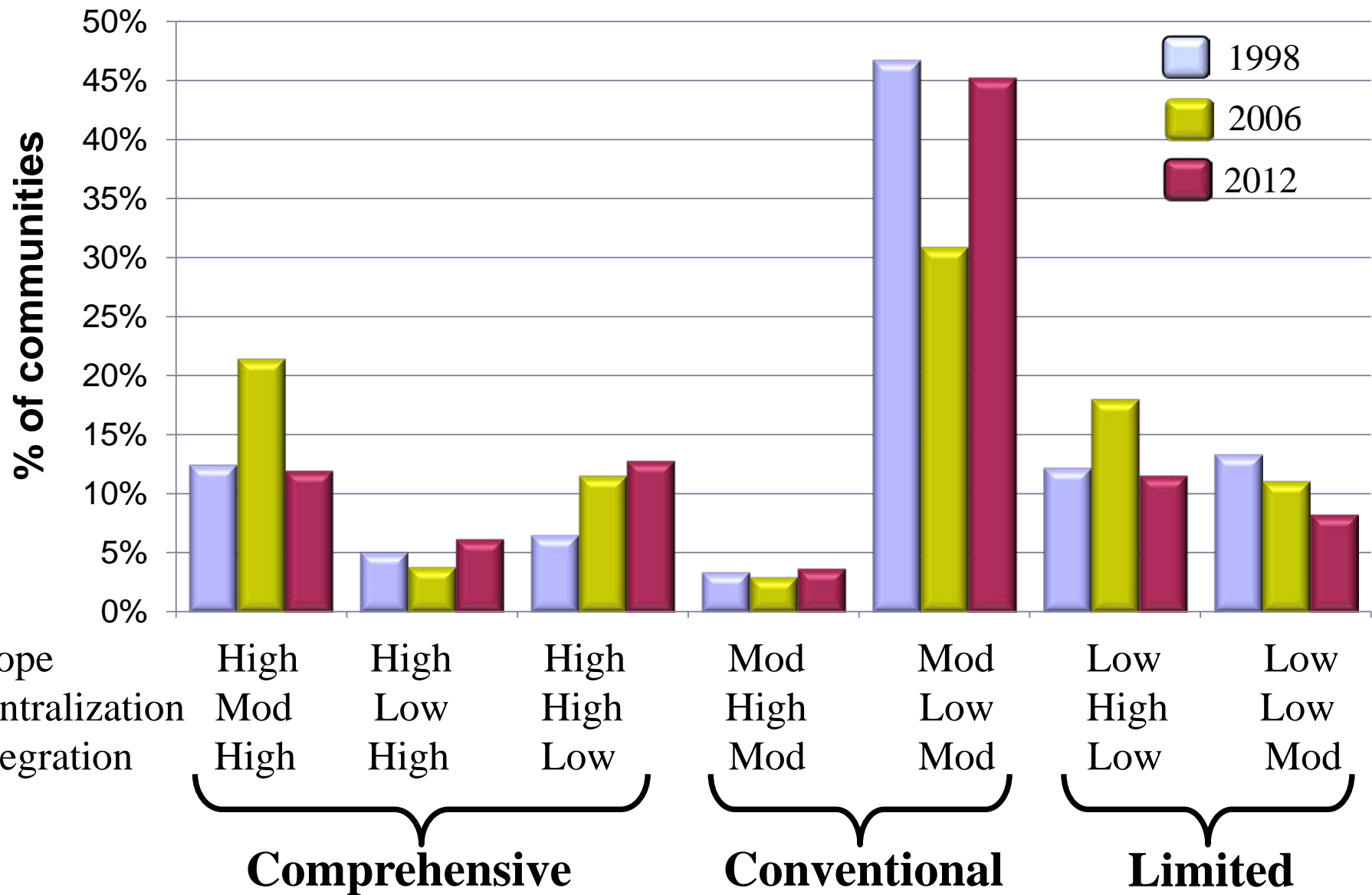
National Longitudinal Survey of Public Health Systems, 2012

# Estimated crowd-out in hospital contributions to public health activities



Note: GLLAMM estimates, holding all other variables constant in the model

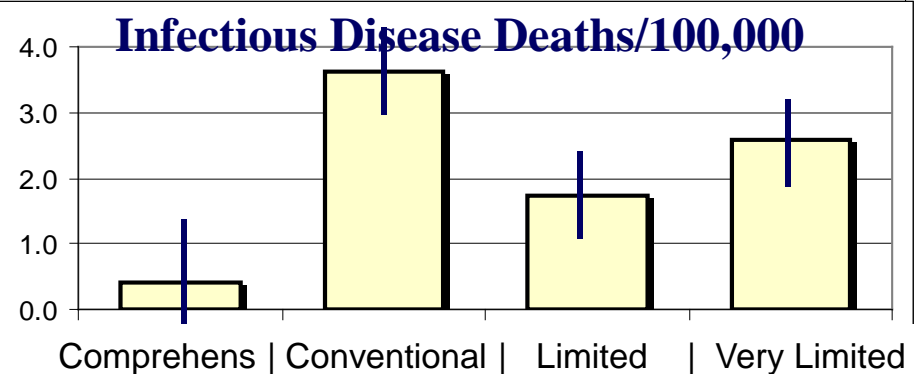
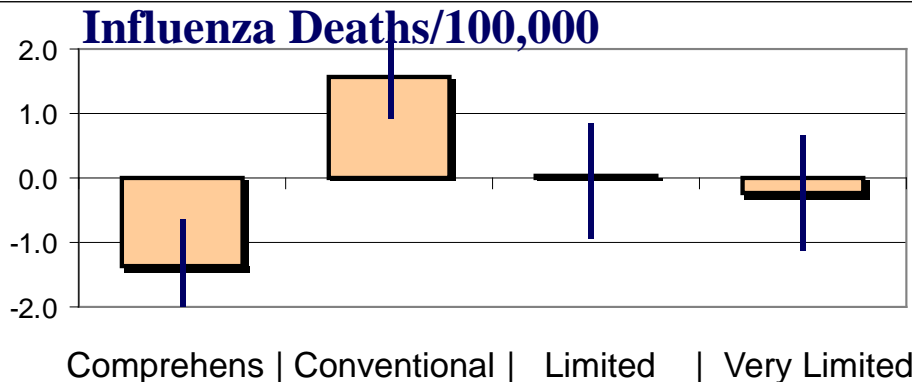
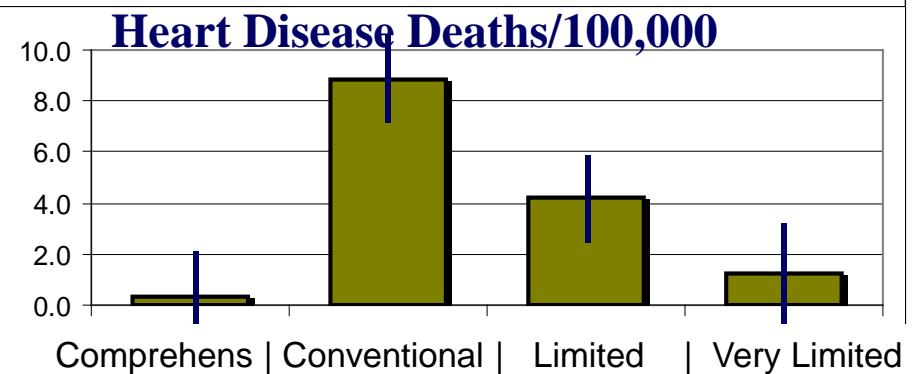
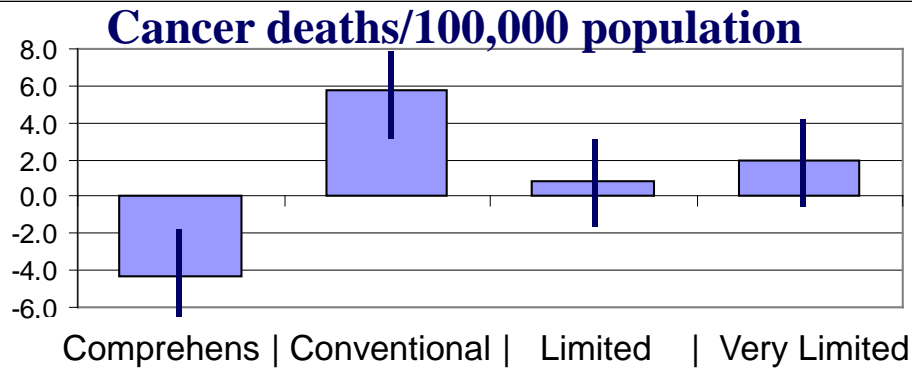
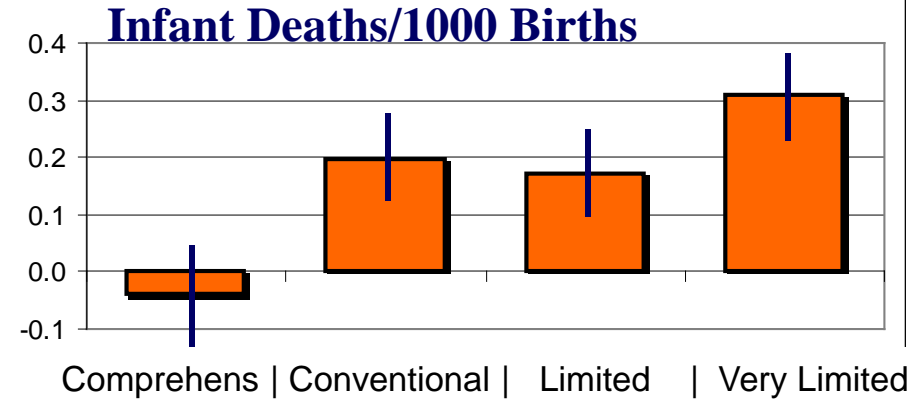
# A typology of public health delivery systems



Source: Mays et al. 2010; 2012

# Population health and delivery system change

## Percent Changes in Preventable Mortality Rates Attributable to Delivery System Type



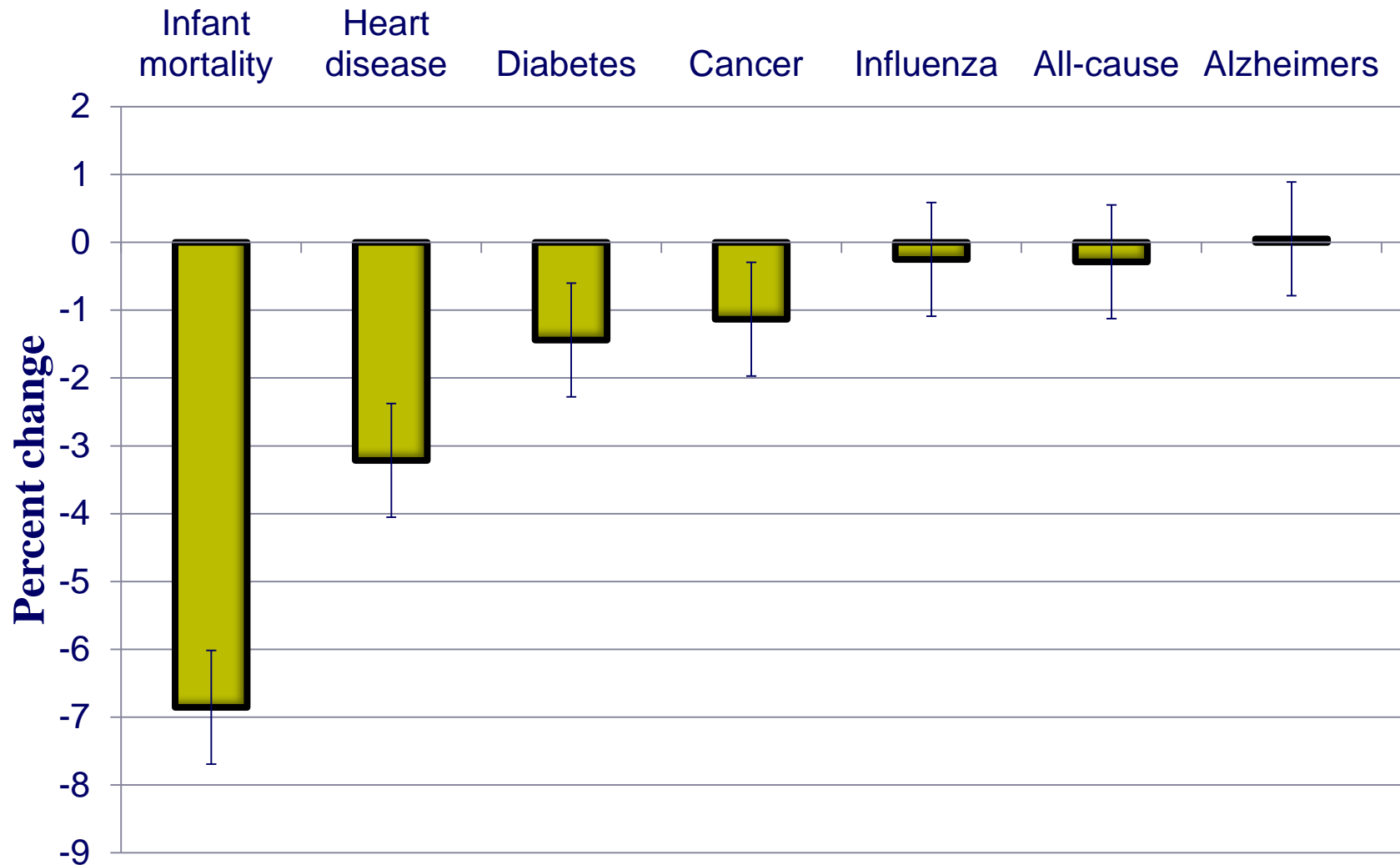
Fixed-effects models control for population size, density, age composition, poverty status, racial composition, and physician supply



# Ongoing research: financing, costs and economics

- How does *public health* spending vary across communities and change over time?
- What are the health effects attributable to changes in public health spending?
- What are the medical cost effects attributable to changes in public health spending?
- What are the opportunities for improving efficiency in public health delivery?

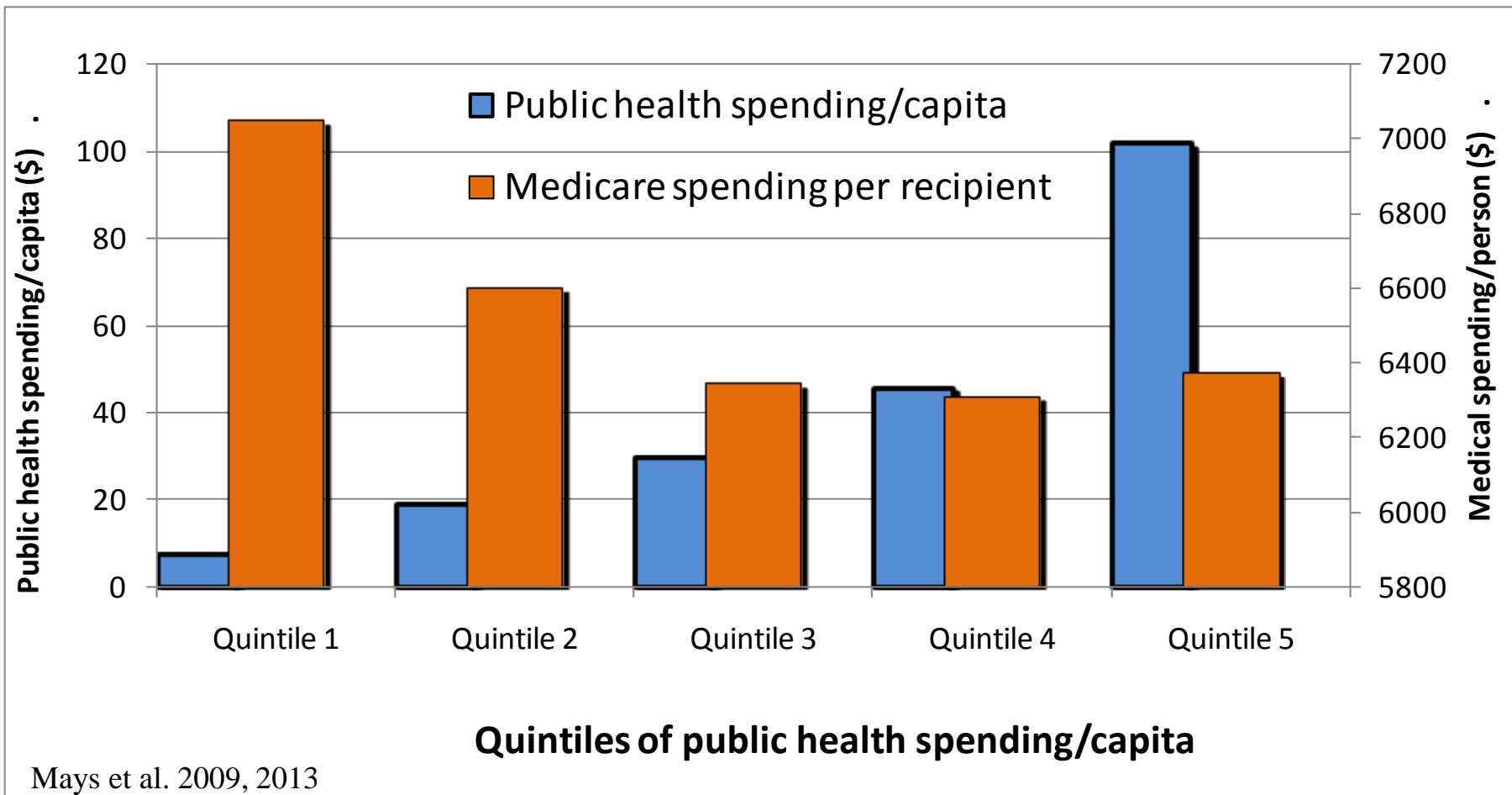
# Mortality reductions attributable to local public health spending, 1993-2008



Hierarchical regression estimates with instrumental variables to correct for selection and unmeasured confounding

# Medical cost offsets attributable to investments in public health delivery, 1993-2008

For every \$10 of public health spending, ≈\$9 are recovered in lower medical care spending over 15 years

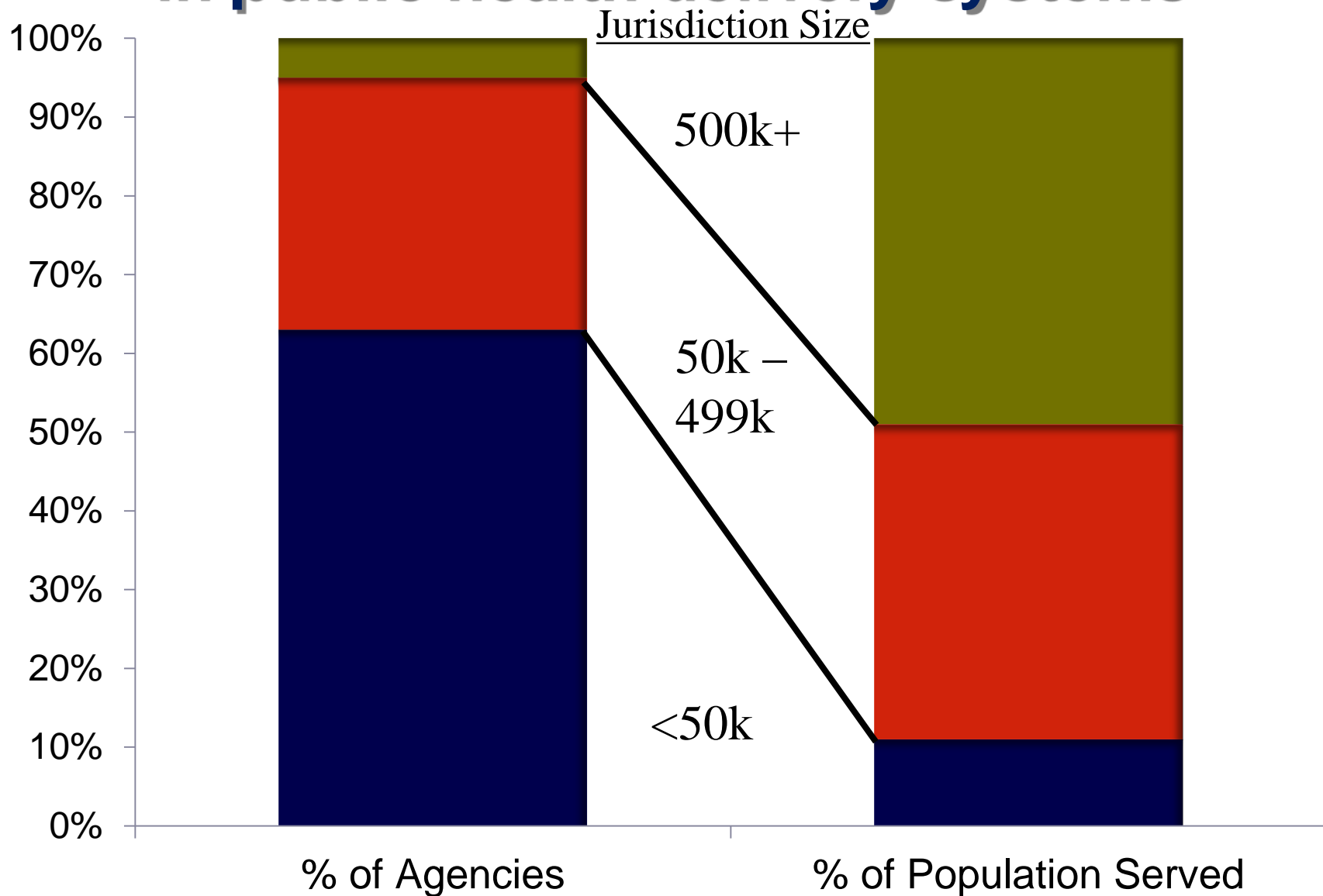


# Estimated value of public health spending

- ◆ 10% increase in public health spending in average community:

Public health cost	\$594,291	
Medical cost offset	-\$515,114	(Medicare only)
LY gained	148	
Net cost/LY	\$534	

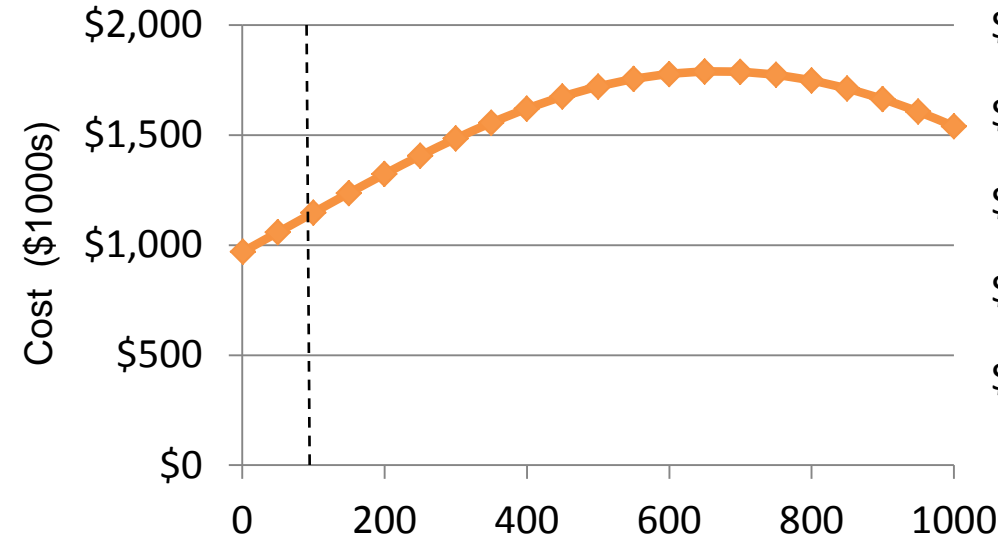
# Economies of scale and scope in public health delivery systems



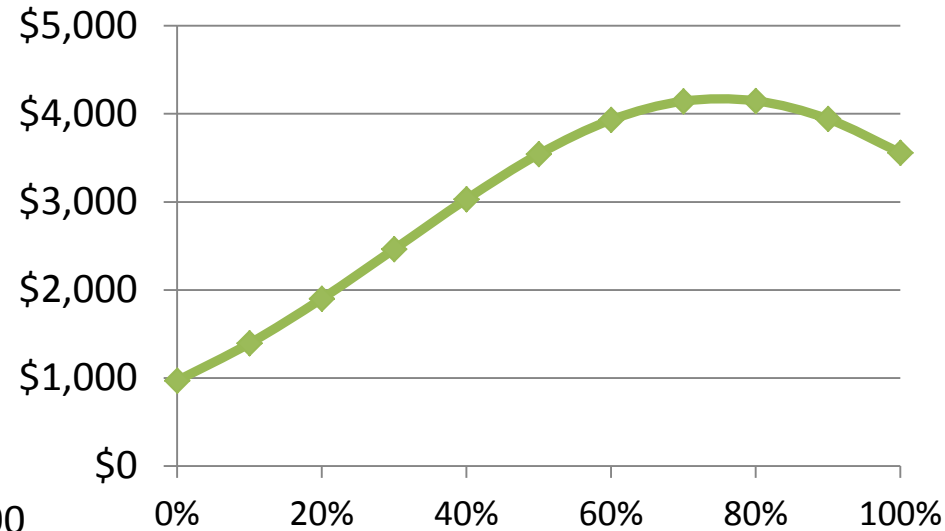
Source: 2010 NACCHO National Profile of Local Health Departments Survey

# Economies of scale and scope in public health delivery

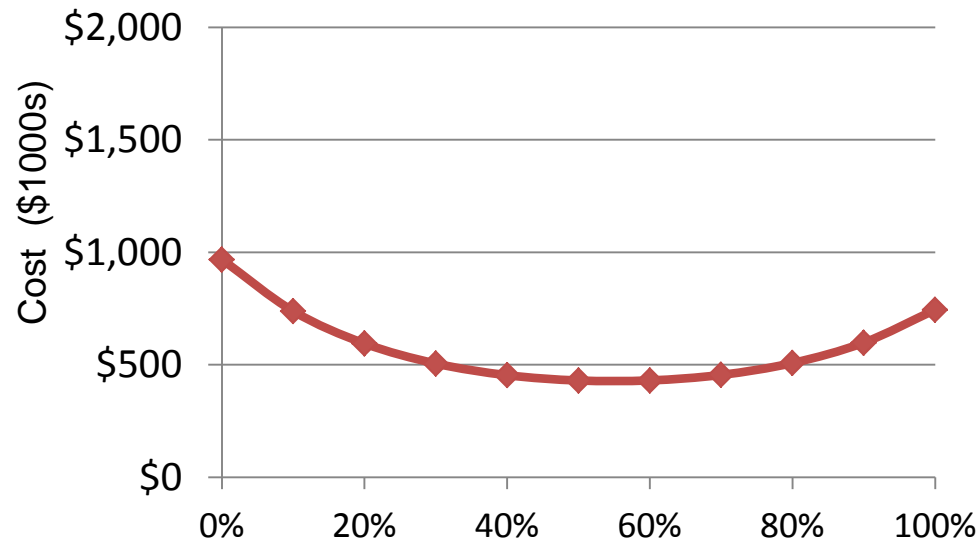
## Scale (Population in 1000s)



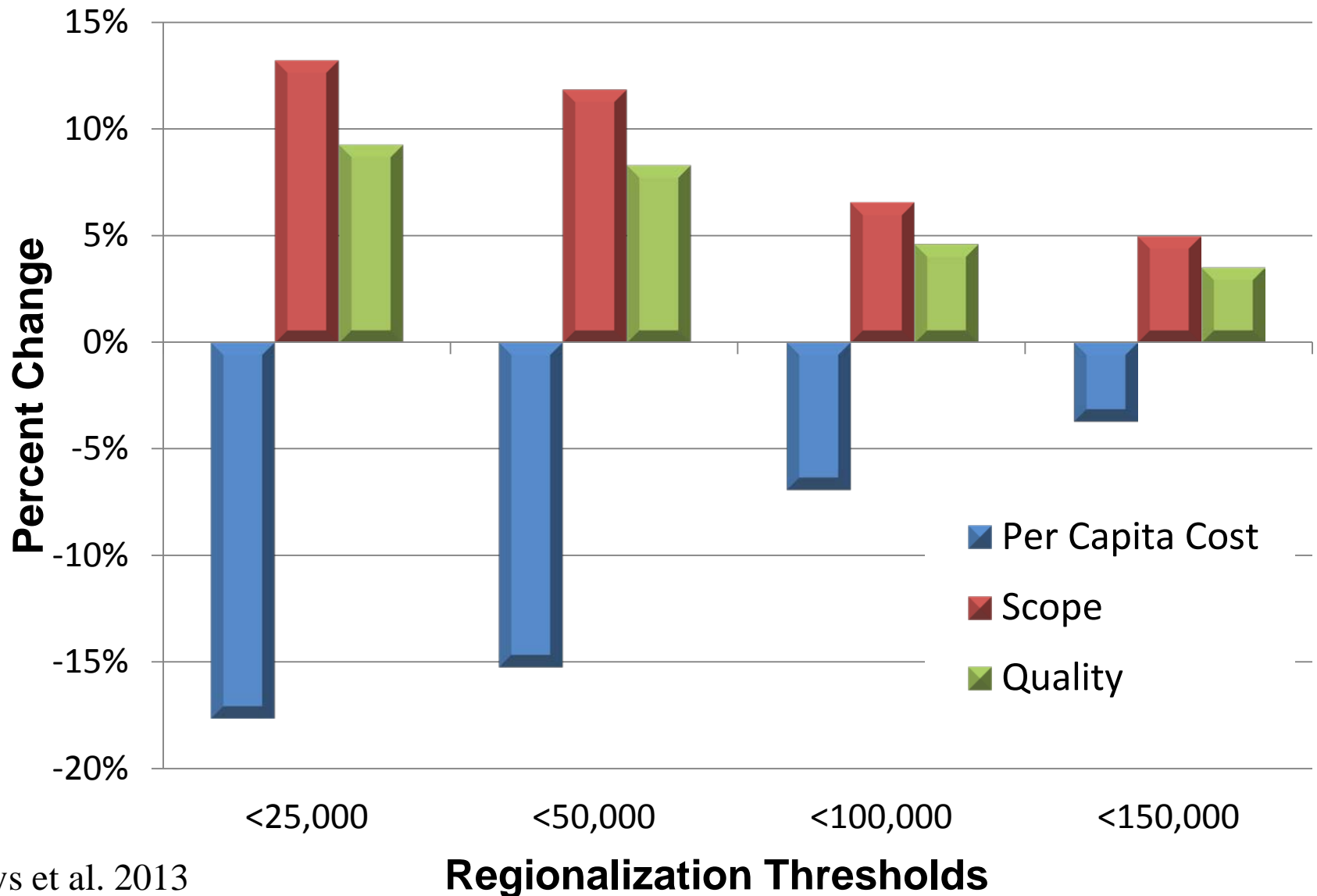
## Scope (% of Activities)



## Quality (Perceived Effectiveness)



# Gains from regionalizing public health delivery



# Studying Production Processes

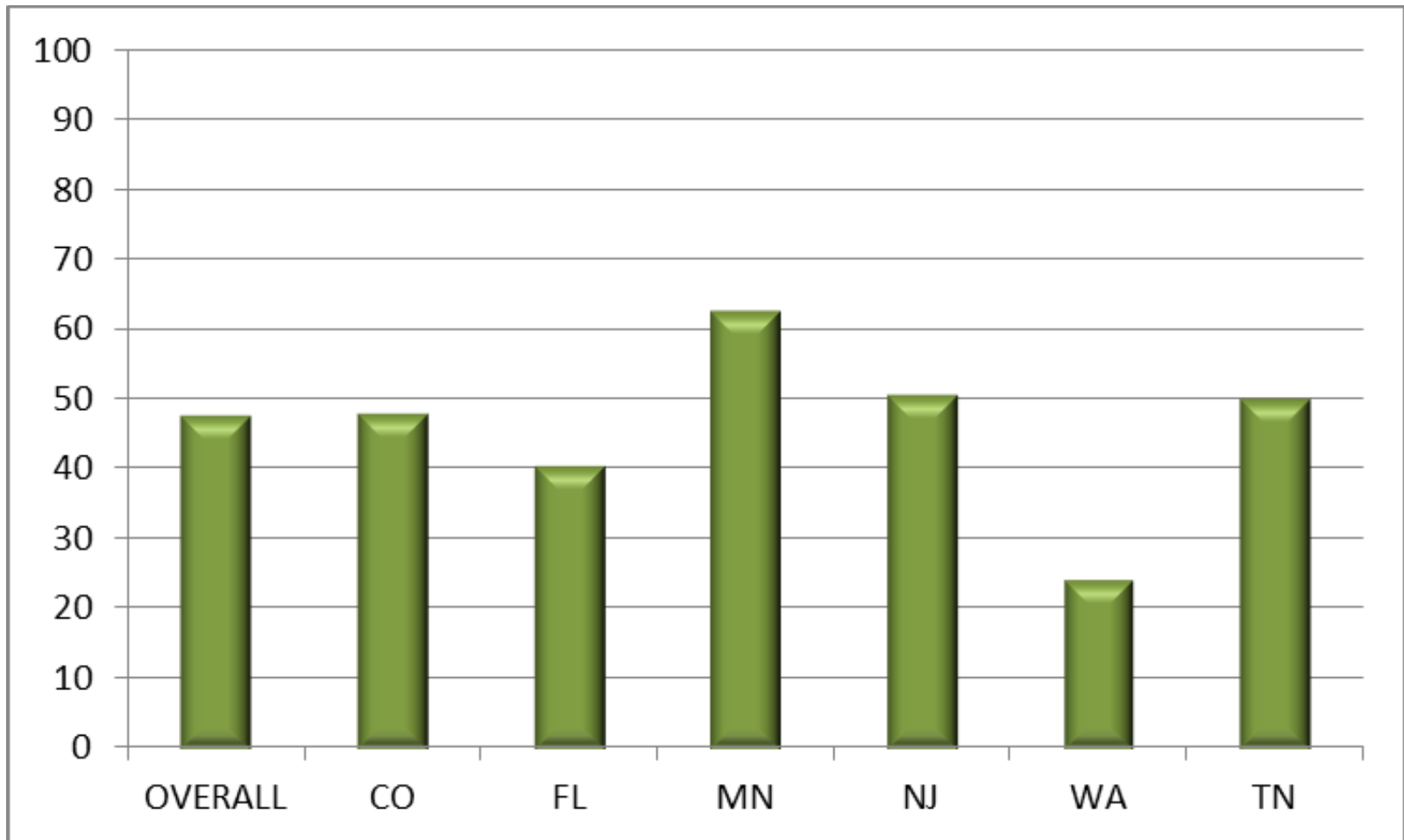
## Multi-Network Practice and Outcome Variation (MPROVE) Study, 2013-14

### Measures of Interest

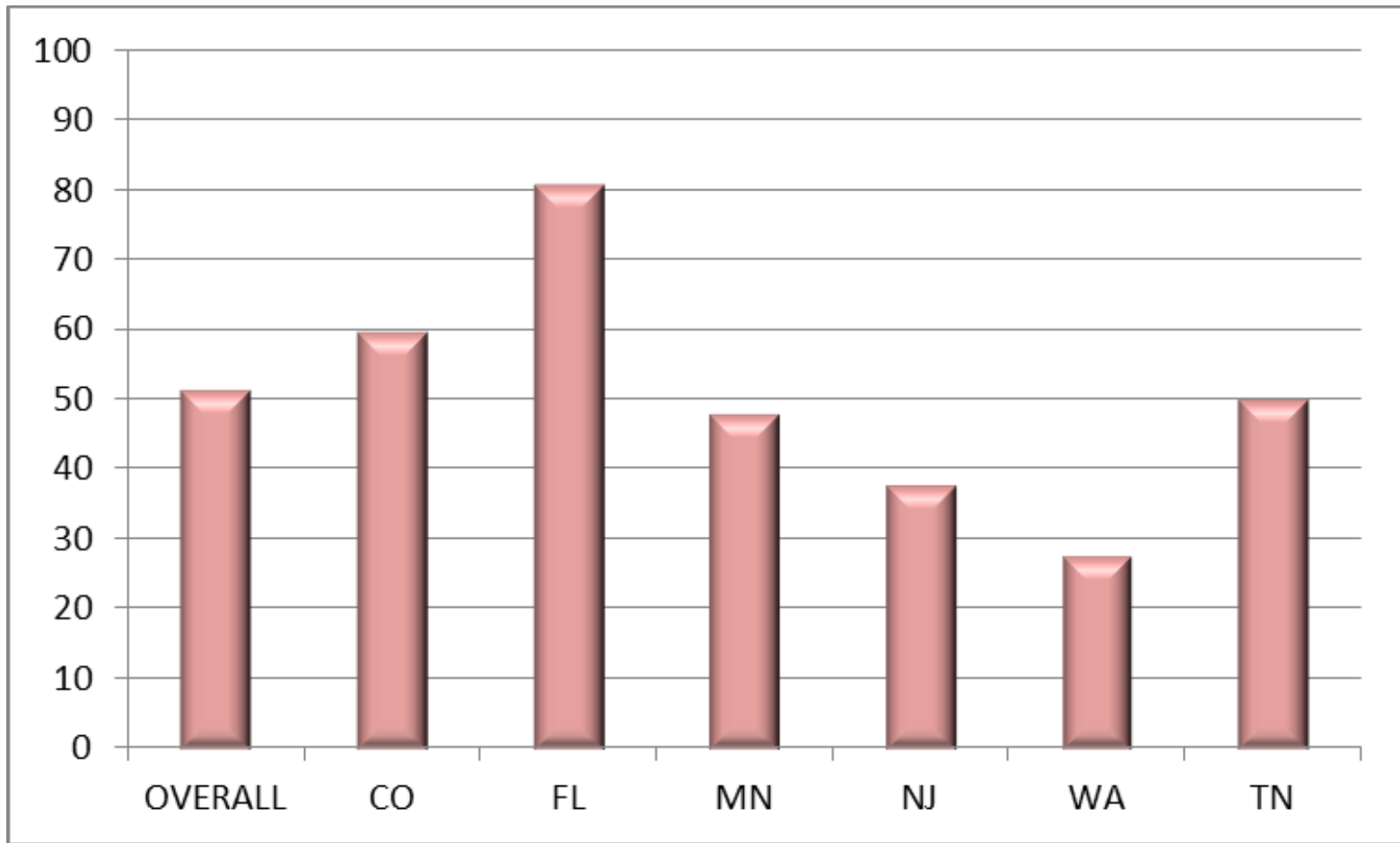
- ***Availability/Scope:*** specific activities produced
- ***Volume/Intensity:*** Frequency of producing activity over period of time
- ***Capacity:*** Labor and capital inputs assigned to an activity
- ***Reach:*** Proportion of target population reached by activity
- ***Quality:*** effectiveness, timeliness, equity of activity
- ***Efficiency:*** resources required to produce given volume of activity



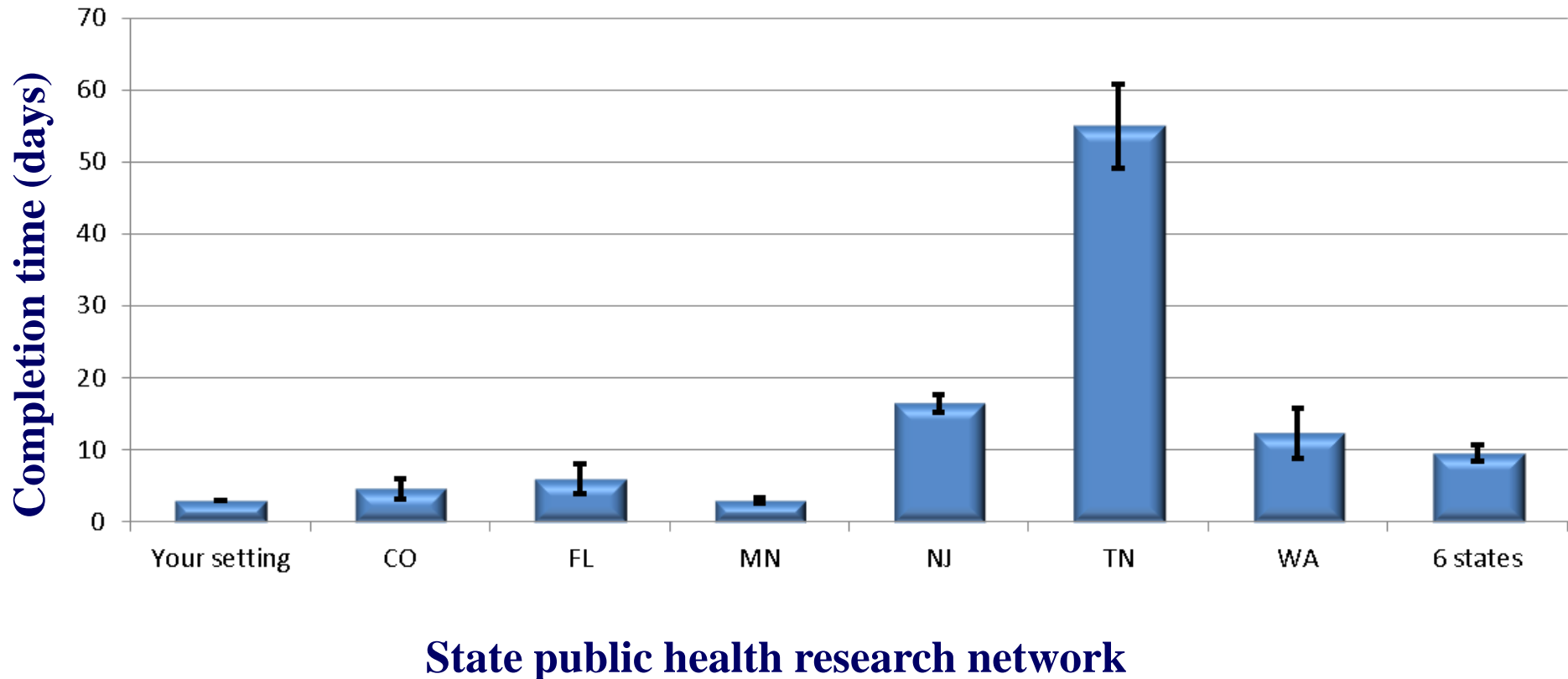
## **MPROVE Example: Implementation of community-wide health education campaigns to promote physical activity**



## **MPROVE Example: Implementation of educational interventions to reduce tobacco use and/or exposure**



# MPROVE Example: timeliness of enteric disease investigations



Multi-network Practice and Outcome Variation Examination Study (MPROVE) 2014

# PBRNs and Practice Engagement

## Local Health Departments Engaged in Research Implementation & Translation Activities During Past 12 months

	PBRN Agencies		National Sample		
<u>Activity</u>	<u>Percent/Mean</u>		<u>Percent/Mean</u>		
Identifying research topics	94.1%		27.5%		***
Planning/designing studies	81.6%		15.8%		***
Recruitment, data collection & analysis	79.6%		50.3%		**
Disseminating study results	84.5%		36.6%		**
Applying findings in own organization	87.4%		32.1%		**
Helping others apply findings	76.5%		18.0%		***
Research implementation composite	84.04	(27.38)	30.20	(31.38)	**
N	209		505		

# Conclusions: getting inside the box

- Engagement of practice and research partners
- Sensitive and specific measures
- Research designs in real-world settings



- What works best in which settings and why
- Informed public health decisions
- Smarter investments and greater value



# Toward a “rapid-learning system” in public health



# For More Information



**Supported by The Robert Wood Johnson Foundation**

Glen P. Mays, Ph.D., M.P.H.

[glen.mays@uky.edu](mailto:glen.mays@uky.edu)

**Email:** [publichealthPBRN@uky.edu](mailto:publichealthPBRN@uky.edu)

**Web:** [www.publichealthsystems.org](http://www.publichealthsystems.org)

**Journal:** [www.FrontiersinPHSSR.org](http://www.FrontiersinPHSSR.org)

**Archive:** [works.bepress.com/glen\\_mays](http://works.bepress.com/glen_mays)

**Blog:** [publichealtheconomics.org](http://publichealtheconomics.org)

